Amendments to the Drawings

Revised drawing of Fig. 7, on replacement sheet 7/11, is appended hereto.

Remarks/Arguments

Claims 1 and 4 - 25 remain pending. Claims 1, 4, 5, 9, and 14 have been amended, and claims 2 and 3 have been cancelled, by way of this amendment. Claims 4 and 5 have been amended to correct their dependency. Claim 9 has been amended to correct a clerical error.

Amendments to the Specification

Applicants have taken the opportunity to amend paragraphs [0028]; [0043]; [0048]; [0054]; and, [0065] of the specification to correct for errors in the reference numeral and to maintain consistency in the reference numerals between the drawings and the specification. Applicants submit that no new subject matter has been introduced by virtue of these amendments.

Objections to the Drawings

In response to the objection to the drawings under 37 CFR 1.83(a), Applicants submit herewith amended Fig. 7 showing the sensor to detect when the threaded rod has reached full stroke, as suggested by the Examiner. Support for this amendment exists in the specification as originally filed in paragraph [0065].

Corrected drawing sheet in compliance with 37 CFR 1.121(d) is submitted herewith. Applicants respectfully request the Examiner to withdraw his objections to the drawings.

Claim Rejections under 35 USC § 102(b) and 102(e)

The Examiner rejected claims 1, 8, 9, and 12-19 as being anticipated by U.S. Patent No. 5,284,423 (Holdsworth et al). The Examiner further rejected claims 1, 8-11, 14-16, and 18-21 as being anticipated by U.S. Patent No. 6,957,747 (Peeler et al).

In response, Applicants have amended independent claims 1 and 14 to clearly define the anti-rotation means and to each include the limitations of claims 2 and 3. By virtue of these amendments, claims 2 and 3 have been cancelled.

Independent claims 1 and 14 now recite:

1. A displacement pump for dispensing a predetermined volume of fluid comprising:

a cylindrical chamber coupled to a fluid dispensing outlet having a first one-way check valve, the cylindrical chamber defining an internal volume for storing at least the predetermined volume of fluid;

a fluid inlet coupled to the cylindrical chamber, the fluid inlet including a second one-way check valve;

a piston slidable in the cylindrical chamber towards the fluid dispensing outlet;

a threaded drive rod connected to the piston;

a stepper motor in threaded engagement with the threaded drive rod, the stepper motor rotatable by a number of steps to slide the piston towards the fluid dispensing outlet by a distance corresponding to the predetermined volume; and

anti-rotation means coupled to the threaded drive rod for inhibiting rotation of the threaded drive rod relative to the stepper motor.

14. A dispensing system for providing a predetermined volume of fluid corresponding to a user selection, comprising:

a user interface for providing electrical selection signals in response to the user selection;

a microprocessor for receiving the electrical selection signals and accessing stored displacement pump calibration data in response to the electrical selection signals, the microprocessor calculating the predetermined volume of fluid to dispense corresponding to the electrical selection signals and the stored displacement pump calibration data, for providing pump control data;

a pump driver for receiving the pump control data and providing motor drive signals; and,

a displacement pump including

a cylindrical chamber coupled to a fluid dispensing outlet having a first one-way check valve, the cylindrical chamber defining an internal volume for storing at least the predetermined volume of fluid,

a fluid inlet coupled to the cylindrical chamber, the fluid inlet including a second one-way check valve,

a piston slidable in the cylindrical chamber towards the fluid dispensing outlet,

a threaded drive rod connected to the piston,

a stepper motor in threaded engagement with the threaded drive rod, the stepper motor rotating in response to the motor drive signals by a number of steps to slide the piston towards the fluid dispensing outlet by a distance corresponding to the predetermined volume of fluid, and

anti-rotation means coupled to the threaded drive rod for inhibiting rotation of the threaded drive rod relative to the stepper motor.

Rejections in view of Holdsworth et al

The anti-rotation means defined in amended independent claims 1 and 14 is coupled to the threaded drive rod for inhibiting the rotation of the threaded drive rod relative to the stepper motor. In contrast, the anti-rotation device, i.e., the off-axis shaft 9 taught by Holdsworth et al passes through an off-axis aperture in the piston 1 thereby preventing the piston 1 from turning within the cylinder (see, for example, column 4, lines 9-11, and Fig. 1). This is confirmed by the Examiner's statement on page 3 of the Official Action, "…*to prevent rotation of the piston*." Moreover, the piston 1, as disclosed by Holdsworth et al, moves on the lead screw 3 due to the rotation of the lead screw. The lead screw, however, stays stationary. Hence the only way piston 1 moves is when the lead screw rotates. Therefore, the lead screw of Holdsworth et al must rotate relative to the motor and there cannot be an anti-rotation means as recited in claims 1 and 14 in the device of Holdswaorth et al.

Applicant submits that Holdsworth et al does not teach all the elements of the independent claims 1 and 14, as amended. In particular, Holdsworth et al fail to teach or disclose an anti-rotation means coupled to the threaded drive rod for inhibiting the rotation of the threaded rod drive. Claims 8, 9, and 12-19 depend, either directly or indirectly from independent claims 1 and 14 and hence, include all limitations thereof. Therefore, withdrawal of the rejections under 35 U.S.C. §102(b) is requested.

Rejections in view of Peeler et al

The Examiner did not raise objections to claims 2 and 3 in view of Peeler et al. Applicants have amended independent claims 1 and 14 to include the limitations of claims 2 and 3. Independent claims 1 and 14 now specify that the fluid dispensing outlet has a first one-way check valve, and that a fluid inlet is coupled to the cylindrical chamber. The fluid inlet is recited as having a second one-way check valve.

Applicants submit that Peeler et al do not teach all the elements of the independent claims 1 and 14, as amended. In particular, the reference fails to teach or disclose a fluid dispensing outlet having a first one-way check valve and a fluid inlet including a second one-way check valve, coupled to the cylindrical chamber (i.e., chamber 38). Claims 8-11, 15, 16, and 18-21 depend, either directly or indirectly from independent claims 1 and 14 and hence, include all limitations thereof. Therefore, withdrawal of the rejections under 35 U.S.C. §102(e) is requested.

Claim rejection under 35 U.S.C. § 103(a)

The Examiner rejected claims 2-5 as being unpatentable over Holdsworth et al in view of U.S. Patent No. 1,984,296 (Witter). The Examiner further rejected claims 22-25 as being unpatentable over Peeler et al in view of U.S. Patent No. 5, 152, 429 to Billings. The Examiner also rejected claims 6 and 7 as being unpatentable over Holdsworth et al as modified by Witter as applied to claim 5, and further in view of U.S. Patent No. 6,968,983 (Laible). Applicants reiterate the comments made above with respect to Holdsworth et al. and with respect to Peeler et al.

As discussed earlier, neither Holdsworth et al nor Peeler et al teach or suggest all of claim limitations of independent claims 1 and 14. Claims 2-7 and 22-25 depend either directly or indirectly from independent claims 1 and 14 and hence, include all limitations thereof. Applicants respectfully submit that since the independent claims are not anticipated, claims depending therefrom are not obvious. Withdrawal of the rejections under U.S.C. §103(a) is respectfully requested.

Summary

In response to the Examiners objections under 35 U.S.C. § 102(b) and 102(e), Applicants have amended independent claims 1 and 14, and have presented arguments in support of novelty of these claims. Claims 8-11, 12, 13, and 15-21 depend, either directly or

indirectly from independent claims 1 and 14 and hence, include all limitations thereof. Therefore, Applicants submit that neither Holdsworth et al nor Peeler et al anticipate the aforementioned claims.

Furthermore, Claims 2-7 and 22-25 depend either directly or indirectly from independent claims 1 and 14 and hence, include all limitations thereof. Applicants respectfully submit that since the independent claims are not anticipated, claims depending therefrom are not obvious.

It is submitted that this application is now in condition for allowance, and action to that end is respectfully requested.

No fee is believed required. However, if a fee is due, the Commissioner is hereby authorized to charge any additional fees, and credit any overpayments to Deposit Account No. 501593, in the name of Borden Ladner Gervais LLP.

Respectfully submitted,

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1. Replacement Drawing Sheet